

July 1, 2010

SANTA ROSA FIRE DEPARTMENT FIRE PREVENTION BUREAU STANDARD



STANDPIPE SYSTEMS

PURPOSE

This standard outlines the general requirements for the installation of standpipe systems.

CODE REFERENCES

2007 California Fire Code (CFC), Chapter 9 Section 905
National Fire Protection Association (NFPA) 14

PERMIT(S) REQUIRED

Standpipe Systems

For the installation of a new system or major modification to an existing system when the system **is not** a combination sprinkler system.

Categories and fee amounts are found at:

<http://ci.santa-rosa.ca.us/doclib/Documents/IB%20018.pdf>

ATTACHMENTS

- 1) Plan Review Checklist – Standpipe Systems
- 2) Inspection Checklist – Standpipe Systems

REQUIRED INSPECTIONS

- 1) Rough and Hydrostatic Inspection(s)
- 2) Sprinkler Final Inspection (including flow test)

Inspections shall be scheduled a minimum of 48 hours in advance. Directions for scheduling are found at:
<http://ci.santa-rosa.ca.us/news/Pages/AutomatedFireInspectionRequestSystem.aspx>

PERMIT REQUIREMENTS

Plans accurately showing the details and arrangement of the standpipe system shall be furnished to the Santa Rosa Fire Department prior to the installation of the system. Such plans shall be clear, readable and drawn to scale. The drawings shall show the location, arrangement, water supply, equipment, and all other details necessary to show compliance with the standard.

The plans shall include specifications covering the character of materials used and shall describe all system components. Plans shall include an elevation diagram.

GENERAL INFORMATION

Standpipe systems are designed to provide fire protection water for hose lines in strategically placed locations inside a structure. They are most common in large-floor-area buildings, where much of the facility may be some distance from an outside entrance, and in multistory buildings, where getting water for hose line use to the upper floors would be difficult if not impossible from a ground-based source.

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Standard Standpipe Systems

Standpipe systems fall into two major categories, manual and automatic. Manual systems provide piping throughout the building but are not equipped with a water supply. They are supplied with water by the fire department in the event of a fire. Automatic systems are connected to a water supply and capable of being supplied by the fire department.

Standpipe systems are primarily divided into three classes based on the configuration of the hose stations.

Class I standpipe provides one 1 1/2-inch outlet and is equipped with hose that may be used by the occupants of the building.

A Class II standpipe is equipped with a 2 1/2-inch outlet and no hose. It is intended to be used by the fire service, not building occupants.

A Class III standpipe system is a combination of the first two. A 2 1/2-inch outlet is typically equipped with a reducing fitting to 1 1/2-inch hose, and the hose is then attached.

TYPES OF STANDPIPE SYSTEMS

Automatic - Dry. An automatic-dry standpipe system shall be a dry standpipe system normally filled with pressurized air that is arranged through the use of devices, such as a dry pipe valve, to automatically admit water into system piping upon opening of a hose valve. The water supply for an automatic-dry standpipe system shall be capable of supplying the system demand.

Automatic - Wet. An automatic-wet standpipe system shall be a wet standpipe system with a water supply capable of supplying the system demand automatically.

Semi-automatic - Dry. A semiautomatic-dry standpipe system shall be a dry standpipe system is arranged through the use of devices, such as a deluge valve, to admit water into system piping upon activation of a remote control device located at the hose connection. A remote control activation device shall be provided at each hose connection. The water supply for a semiautomatic-dry standpipe system shall be capable of supplying the system demand.

Manual - Dry. A manual-dry standpipe system shall be a dry standpipe system that does not have a permanent water supply attached to the system. Manual - dry standpipe systems require water from a fire department pumper (or the like) to be pumped into the system through the fire department connection to supply the system demand.

Manual - Wet. A manual-wet standpipe system shall be a wet standpipe system connected to a small water supply for the purpose of maintaining water within the system, but does not have a water supply capable of delivering the system demand attached to the system. Manual - wet standpipe systems require water from a fire department pumper (or the like) to be pumped into the system to supply the system demand.

REQUIREMENTS FOR MANUAL STANDPIPE SYSTEMS

Manual standpipe systems shall not be used in high-rise buildings. Each hose connection for manual standpipes shall be provided with a conspicuous sign stating "MANUAL STANDPIPE FOR FIRE DEPARTMENT USE ONLY". Manual standpipes shall not be used for Class II or Class III systems.

REQUIREMENTS FOR DRY STANDPIPE SYSTEMS

Dry standpipes shall only be used where piping is subject to freezing. Dry standpipes shall not be used for Class II or Class III systems. Where required by the City of Santa Rosa in buildings under construction or more than 4 stories in height, a standpipe system, either temporary or permanent in nature, shall be provided in buildings that have interior areas that are more than 100 feet travel distance from the nearest point accessible to fire apparatus

Standard Standpipe Systems

shall be equipped with one or more approved Class I standpipe systems. If building is equipped with automatic sprinklers, the system may be required to be a combined system.

HYDRAULIC CALCULATIONS

Where standpipe system piping is sized by hydraulic calculations, a complete set of calculations shall be submitted with the plans.

STANDPIPE DESIGN

Standpipes shall be designed in accordance with the California Fire Code Chapter 9 Section 905 and the National Fire Protection Association (NFPA) Standard 14. Piping used in Standpipe systems shall meet the standards described in NFPA 14 Section 4.2. In standpipes systems for Class I services, each standpipe shall be sized for a minimum flow of 500 GPM. Standpipes not exceeding 100 feet in height, in Class I and II systems shall be at least 4 inches in size. The minimum size of riser(s) for combined systems shall be 6 inches, except when the building is completely sprinklered; the riser(s) may be hydraulically calculated.

Standpipe system piping shall be protected from mechanical damage. Standpipes and lateral piping supplied by standpipes shall be located in enclosed exit stairways or shall be protected by a degree of fire resistance equal to that required for enclosed exit stairways in the building in which they are located.

PRESSURE LIMITS

Hydraulically designed standpipe systems shall be designed to provide the required flow rate with a minimum residual pressure of 100 (6.9 bar) at the outlet of the hydraulically most remote 2½ in. (65 mm) hose connection and 65 psi (4.5 bar) at the outlet of the hydraulically most remote 1½ in. (40 mm) hose station. Pipe schedule designed standpipe systems shall have piping sized in accordance with the pipe schedule and provide the required water flow rate at a minimum residual pressure of 100 psi (6.9 bar) at the topmost 2½ in. (65 mm) hose connection and 65 psi (4.5 bar) at the topmost 1½ in. (40 mm) hose station.

Where the residual pressure at a 1½ in. (40 mm) outlet on a hose connection available for trained personnel use exceeds 100 psi (6.9 bar), an approved pressure-regulating device shall be provided to limit the residual pressure at the flow required by Section 7.10 to 100 psi (6.9 bar). Where the static pressure at a hose connection exceeds 175 psi (12.1 bar), an approved pressure-regulating device shall be provided to limit static and residual pressures at the outlet of the hose connection to 100 psi (6.9 bar) for 1½ in. (40 mm) hose connections available for trained personnel use and 175 psi (12.1 bar) for other hose connections.

MINIMUM FLOW RATE

For Class I and Class III systems, the minimum flow rate for the hydraulically most remote standpipe shall be 500 gpm. The minimum flow rate for additional standpipes shall be 250 gpm (946 L/min) per standpipe, with the total not to exceed 1250 gpm (4731 L/min) or 1000 gpm (3785 L/min) for buildings sprinklered throughout. When the floor area exceeds 80,000 ft² (7432 m²), the second most remote standpipe shall be designed to accommodate 500 gpm (1893 L/min).

DRAINS

A permanently installed 3 in. drain riser shall be provided adjacent to each standpipe equipped with pressure-regulating devices to facilitate tests of each device. Each drain riser shall terminate with a full-size elbow to grade or receptor that will receive the full flow from the drain riser. Where drain risers are interconnected and run to a common discharge point, all piping shall be sized for the combined flow. Standpipe systems shall be provided with a means of draining. Main drain test connections shall be provided at locations that permit flow tests of water supply connections.

LOCATIONS OF HOSE CONNECTIONS

Hose connections and hose stations shall be unobstructed and shall be located not less than three (3) feet (0.9 m) or more than five (5) feet (1.5 m) above the floor. Class I systems shall be provided with 2 1/2 inch (63.5 mm) hose connections in the following locations:

- a) At each intermediate landing between floor levels in every required exit stairway.
Exception: Hose connections shall be permitted to be located at main floor landings in exit stairways when approved by the authority having jurisdiction.
- b) On each side of the wall adjacent to exit openings of horizontal exits.
- c) In each exit passageway at the entrance from building areas into the passageway.
- d) In covered mall buildings, at the entrance to each exit passageway or exit corridor, and at exterior public entrances in the mall.
- e) At the highest landing of stairways with stairway access to a roof, and on the roof where stairways do not access the roof.
- f) Where the most remote portion of a unsprinklered floor or story exceeds 150 feet (45.7 m) of travel distance from a required exit or the most remote portion of a sprinklered floor or story exceeds 200 feet (61 m) of travel distance from a required exit, additional hose connections shall be provided, in approved locations, where required by the local fire department.

Hose valve(s) shall have external threads having the NH standard thread, for the valve size specified, as specified in NFPA 1963. A connection through which the public fire department can pump water into the standpipe system shall be provided. There shall be no shutoff valve in the fire department connection. Hose connections shall be approved type and shall be equipped with standard caps, properly secured and arranged for easy removal by fire department. Hose connections shall be on the street side of buildings and shall be located and arranged so hose lines can be readily and conveniently attached to the inlets without interference from any nearby objects including buildings, fences, posts, or other fire department connections. Hose connections shall be designated by a sign having raised letters at least one inch in size cast on a plate or fitting, reading "STANDPIPE". Fire department connections shall be designated by a sign having raised letters at least one inch in size cast on a plate or fitting, reading "FIRE DEPARTMENT CONNECTION STANDPIPE".

FIRE DEPARTMENT CONNECTIONS (FDC)

Shutoff valves shall not be installed between the fire department connection and the system. A listed check valve shall be installed in each FDC and located as near as practicable to the point where it joins the system. FDC's shall be visible and recognizable from the street or nearest point of fire department apparatus accessibility or on the street side of buildings and shall be located and arranged so that hose lines can be attached to the inlets without interference from nearby objects, including buildings, fences, posts, landscaping, vehicles, or other fire department connections. FDC's shall be located not more than 100 ft (30.5 m) from the nearest fire hydrant connected to an approved water supply.

Each fire department connection shall be designated by a sign having letters, at least 1 in. (25.4 mm) in height that reads "STANDPIPE." If automatic sprinklers are also supplied by the fire department connection, the sign or combination of signs shall indicate both designated services (e.g., "STANDPIPE AND AUTOSPKR," or "AUTOSPKR AND STANDPIPE"). A sign also shall indicate the pressure required at the inlets to deliver the system demand.

Standard
Standpipe Systems

Where a Fire department connection services multiple buildings, structures, or locations, a sign shall be provided indicating the buildings, structures, or locations served.

HOSE STATIONS

Cabinets used to contain fire hose shall be of a size to allow the installation of the necessary equipment at hose stations and designed so they do not interfere with the prompt use of the hose connection, the hose, and other equipment at the time of fire. All glazing shall be tempered safety glass or plastic glazing and where a fire-resistive assembly is penetrated by a cabinet, the fire resistance of the assembly shall be maintained as required by the local building code. The hose, hose racks, reels, and nozzles shall be listed.

SYSTEM TESTING

All new welded piping shall be inspected by the Santa Rosa Fire Department. Once installed, systems including yard piping shall be tested hydrostatically at not less than 200 psi pressure for two hours and witnessed by Santa Rosa Fire Department Personnel. A flow test will be required to demonstrate there are no obstructions and that the system can meet the designed and approved demand.